

A TEST OF AN INTERACTIVE MODEL OF BINGE EATING IN MEN

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**Title**

A Test of an Interactive Model of Binge Eating in Men

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**MASTER OF SCIENCE**

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## **ABSTRACT**

Past research has shown that a combination of high perfectionism, high body dissatisfaction, and low self-esteem is predictive of binge eating in college women (Bardone-Cone et al., 2006). The aim of the present study was to determine whether this triple interaction model was applicable to men. Male undergraduate college students from a Midwestern university (n=302) completed self-report measures online at two different time points. Analyses revealed a significant interaction between the three risk factors, such that high perfectionism, high body dissatisfaction, and low self-esteem at Time 1 was predictive of greater Time 2 binge eating symptoms. However, the triple interaction was no longer clinically meaningful when baseline binge eating symptoms were statistically controlled for in the analysis. The model did not predict Time 2 anxiety or depressive symptoms, which suggests some specificity. These findings offer a greater understanding of the interactive nature of risk factors in predicting binge eating in men.

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## **CHAPTER 1. A TEST OF AN INTERACTIVE MODEL OF BINGE EATING IN MEN**

Binge eating episodes are characterized by the consumption of substantially more food than would be expected in a given situation and the subjective experience of loss of control (American Psychiatric Association, 2013). The lifetime prevalence for recurrent binge eating among men and women in the United States is approximately 4% and 5%, respectively (Hudson et al., 2007). Individuals with binge eating disorder (BED; characterized by binge eating episodes occurring at least once per week over a three-month period, as well as associated distress and impairment; American Psychiatric Association, 2013) are at increased risk for a variety of mental and physical health problems (Hudson et al., 2007; Pike, Dohm, Striegel-Moore, Wilfley, & Fairburn, 2001). Specifically, physical problems include those associated with the weight gain that accompanies binge eating (e.g., type 2 diabetes, high blood pressure, heart disease) and psychological problems include higher rates of anxiety disorders, depression, substance abuse, and personality disturbance (Wonderlich, Gordon, Mitchell, Crosby, & Engel, 2009). Thus, it is important to understand factors that contribute to binge eating so that it can be treated and prevented. The current study focused on examining factors that contribute to binge eating among college men through a secondary data analysis of archival data.

As reported above, the prevalence of recurrent binge eating in men is almost as high as the rate in women (Hudson et al., 2007). Notably, subclinical BED was even more prevalent among men than women in a recent study, 1.9% and 0.6%, respectively (Hudson et al., 2007). However, research on disordered eating in men is inadequately represented in the literature as compared to research on disordered eating in women (Jones & Morgan, 2010). This may be due to the substantial gender difference in the rates of other types of disordered eating. That is, women are far more likely than men to have anorexia nervosa and bulimia nervosa (Hudson et

al., 2007). The relatively comparable rates of binge eating among men and women highlight the necessity for determining factors that put men at risk for binge eating.

Although men have been understudied as compared to women, existing studies show that men and women presenting with disordered eating tend to share common risk factors and exhibit overlap in clinical presentation (Jones & Morgan, 2010). With regards to binge eating, men and women appear to exhibit similar levels and types of symptoms (Barry, Grilo, & Masheb, 2002; Morgan et al., 2002; Tanofsky, Wilfley, Spurrell, Welch, & Brownell, 1995), comorbid mental health problems (Tanofsky et al., 1995), medical complications, and impairment (Striegel, Bedrosian, Wang, & Schwartz, 2011). Given the similarities in the presentations of men and women who engage in binge eating, it is reasonable to hypothesize that theoretical models applying to binge eating among women may also apply to men.

### **Triple Interaction Model**

Past research has reported significant correlations between single risk factors and binge eating (Wonderlich et al., 2009). However, it is unlikely that a single factor accounts for the majority of the risk for the development of binge eating. Examining the potential interaction between demonstrated risk factors may aid in the development of a more complete model. One such model is the triple interaction model (Joiner, Heatherton, & Rudd, 1997; Vohs, Bardone, Joiner, & Abramson, 2001; Bardone-Cone, Abramson, Vohs, Heatherton, & Joiner, 2006), a model which has found that a combination of high perfectionism, high body dissatisfaction, and low self-esteem interact to predict bulimia nervosa symptom development among women (Bardone-Cone et al., 2006).

This model was originally developed when Joiner et al. (1997) reported that perfectionism served as a risk factor for bulimic symptoms for individuals who perceived



themselves as overweight, but did not serve as a risk factor for those who did not perceive themselves as overweight. Joiner et al. (1997) postulated that since perfectionists feel compelled to attain unrealistic standards, the perception that they are overweight implies an unmet standard, and this perceived failure would result in negative affect. The probability of binge eating behavior has been shown to increase following increases in negative affect in individuals with bulimia nervosa (Smyth et al., 2009). Binge eating is thought to serve as a distracting escape from this negative affect (Heatherton & Baumeister, 1991).

Vohs, Bardone, Joiner, and Abramson (1999) expanded upon this model with the addition of self-esteem as a variable. Specifically, they proposed that people with high levels of perfectionism who perceive themselves to be overweight would have high levels of bulimic symptoms if they also had low self-esteem. Vohs et al. (1999) proposed that perfectionistic individuals who perceived themselves as overweight would be more likely to engage in counterproductive behaviors such as binge eating if they possessed low self-esteem, whereas those with high self-esteem would be more likely to engage in goal-directed behaviors such as dieting and/or exercising for weight loss. The escape theory of binge eating, which posits that the act of binge eating serves as a means of focusing the individual's attention toward food and away from negative emotions, explains why someone with low self-esteem would resort to binge eating - individuals with low self-esteem experience more negative emotions and may feel incapable of handling such emotions (Heatherton & Baumeister, 1991).

In contrast to previous studies, which only examined the interaction model in undergraduate women, Holm-Denoma et al. (2005) found that the model predicted the maintenance and exacerbation of bulimic symptoms in adult women over an extended period of time. Bardone-Cone et al. (2006) added further specificity to the triple interaction model by

demonstrating that it specifically predicts binge eating and not inappropriate compensatory behaviors such as purging (Bardone-Cone et al., 2006). Of note, Shaw, Stice, and Springer (2004) failed to replicate the findings of previous studies in a sample of adolescent girls. However, methodological differences (e.g., ages of participants, measurements used) may explain the inconsistent findings (Shaw et al., 2004). The triple interaction model has never been tested in men. However, some research has been conducted on each of the individual risk factors among men. Research on each of the individual risk factors in the model is reviewed below.

### **Perfectionism**

Numerous studies have shown that men and women with anorexia nervosa or bulimia nervosa tend to have higher levels of perfectionism than healthy controls (for a review, see Bardone-Cone et al., 2007). However, studies examining the relationship between binge eating and perfectionism have yielded more inconsistent results (Bardone-Cone et al., 2007; Forbush, Heatherton, & Keel, 2007). Forbush et al. (2007) found an association between perfectionism and binge eating for women but not for men. However, only a univariate model was tested in this study, and perfectionism may be a risk factor when other variables are considered (i.e., it may interact with other variables to predict binge eating). The findings of another study examining the relationship between specific disordered eating behaviors and perfectionism in men may support this notion - a significant relationship between perfectionism and binge eating was dependent on the presence of fasting (Stein et al., 2007). It is possible that the presence of fasting represents individuals who are dissatisfied with their bodies (a moderating variable in the triple interaction model), and that this is a risk factor for binge eating for individuals with high levels of perfectionism.

Recently, more evidence has been emerging linking a specific facet of perfectionism to binge eating. Socially prescribed perfectionism, perceiving that others are demanding perfectionism of oneself, has been found to be associated with eating disorder variables (e.g., eating concern, weight and shape concern, and binge eating severity) related to BED and a vulnerability factor for binge eating (Pratt, Telch, Labouvie, Wilson, & Agras, 2001; Sherry & Hall, 2009). Similarly, “concern over mistakes,” another construct related to perfectionism, was found to make one more vulnerable to engaging in binge eating and to predict changes in binge eating over time (Mackinnon et al., 2011).

### **Body Dissatisfaction**

Body dissatisfaction is associated with an increased likelihood of binge eating in both concurrent and longitudinal studies (Grilo, Masheb, Brody, Burke-Martindale, & Rothschild, 2005; Johnson & Wardle, 2005; Stice & Shaw, 2002). Of interest for the current paper, body dissatisfaction has been linked to binge eating in college men (Gordon, Holm-Denoma, Troop-Gordon, & Sand, 2012). In addition, like women, men with BED have demonstrated higher levels of body dissatisfaction than healthy controls (Ousley, Cordero, & White, 2008).

A related concept, overvaluation of shape and weight, has also been the focus of binge eating research. Overvaluation of weight and shape indicates an undue importance assigned to these factors, whereas body dissatisfaction indicates one’s perception that their body does not meet their standards. While these terms are not synonymous, they are related because individuals who overvalue shape and weight may be more prone toward distress caused by body dissatisfaction, because their mood and self-esteem are unduly influenced by their perceptions of their weight and shape.

Overvaluation of weight and shape has also been implicated in binge eating and research suggests that this type of weight concern is associated with perceived rather than actual weight status among individuals with BED and bulimia nervosa (Hrabosky, Masheb, White, & Grilo, 2007). Furthermore, overvaluation of shape and weight has been found to be significantly associated with symptom severity among individuals with BED; high degrees of weight and shape concerns are associated with greater levels of psychopathology and impairment (Ojserkis, Sysko, Goldfein, & Devlin, 2012). The relation between body overvaluation and binge eating has also been found to be present in individuals in their early adolescence. Children who reported episodes of loss of control (LC) during eating, a criterion for a diagnosis of BED, exhibited significantly higher levels of weight and shape overvaluation than those with no loss of control (NoLC). Sixty-two percent of children in LC group reported/rated weight and shape “pretty important” or “very important” for self-evaluation whereas only thirty-two percent in the NoLC group reported such ratings.

The belief that one’s body weight is not ideal is associated with increased likelihood of binge eating and contributed to the prediction of binge eating after controlling for BMI in multiple studies (Johnson & Wardles, 2005; Siqueira, Appolinario, & Sichieri, 2005; Saules et al., 2009). Both men and women with BED reported higher levels of concern about body tone and shape than individuals without BED. Notably, men and women with eating disorder symptoms do not report significantly different levels of body concern (Ousley et al., 2008). Weight and shape concerns, one index of body dissatisfaction, are associated with binge eating in the presence of the desire to lose weight in men (De Young, Lavender, & Anderson, 2010). Both elevated weight and shape concerns and the desire to lose weight may be indices of dissatisfaction with one’s body and therefore may suggest that body dissatisfaction is associated

with binge eating in men. Altogether, body dissatisfaction and undue importance placed on weight and shape have been implicated in binge eating.

Research suggests men have become increasingly concerned about their bodies with respect to muscularity (McCreary & Sasse, 2000). Body shape ideals appear to be gender-specific, in that women tend to value thinness and men tend to strive to be muscular (Owen & Laurel-Seller, 2000; Raudenbush & Meyer, 2003). Thus, muscle dissatisfaction, as opposed to body dissatisfaction, which typically refers to shape and weight concerns, may be a more relevant measure of body dissatisfaction in men. Although a specific link between muscle dissatisfaction and binge eating has not yet been established, drive for muscularity has been shown to be a risk factor for disordered eating among men (Grossbard et al., 2013). Given these findings, we ran an additional analysis of the triple interaction using a measure of body dissatisfaction related to muscularity rather than thinness to see if that was more relevant for men.

### **Self-esteem**

Self-esteem has been found to moderate the relationship between binge eating and treatment outcome in individuals with BED, such that lower self-esteem was associated with worse outcomes (Geller, Srikameswaran, Cockell, & Aitsoff, 2000). A prospective study examining risk factors for binge eating found that male adolescents and young adults with low self-esteem had an increased likelihood of binge eating onset (Goldschmidt, Wall, Loth, Le Grange, & Neumark-Sztainer, 2012). Furthermore, individuals with low self-esteem were more likely to report instances of binge eating than individuals with a higher self-esteem in a study examining binge eating and self-esteem among obese men and women (Grilo et al., 2005).

Individuals with low self-competence (a facet of self-esteem indicating one's belief in their ability to change) are less likely to believe in their ability to lose weight (Bardone-Cone et al., 2006). Low self-competence, particularly in the presence of high perfectionism and body dissatisfaction, may result in engaging in counterproductive behaviors (e.g., binge eating) as a means to avoid the negative affect that would result from the interaction of these variables (Bardone-Cone et al., 2006; Vohs et al., 1999). There is limited research concerning self-esteem and its association with binge eating in men. However, extant research suggests that there is a link between low self-esteem and binge eating. Thus, further research examining these constructs is warranted.

### **The Current Study**

The current study sought to determine whether the triple interaction model (i.e., the interaction between perfectionism, body dissatisfaction, and self-esteem) significantly predicts binge eating in college men. Body mass index (BMI) has been previously linked to several variables in the model such as binge eating, body dissatisfaction and self-esteem (Sonneville et al., 2012). To rule BMI out as a confounding variable, we controlled for participants' BMI. We expected the greatest levels of binge eating symptoms at Time 2 (approximately two months after initial assessment) to occur in men with relatively higher levels of perfectionism who are dissatisfied with their bodies and who have low self-esteem. It was posited that binge eating symptoms would be significantly lower for all other combinations of variables. Furthermore, we tested whether the interaction model displayed specificity to binge eating symptoms, as opposed to also predicting anxiety and depressive symptoms. When the model was tested in college women, Vohs et al. (2001) found some support for the model's specificity in that it did not predict anxiety symptoms, but did predict depressive symptoms. These findings are in opposition

to those of Holm-Denoma et al. (2005), which found that the model predicted both the onset and exacerbation of anxiety symptoms in a sample of middle-aged women, but not depressive symptoms. Therefore, our test for specificity is somewhat exploratory in light of past mixed findings.

## CHAPTER 2. METHOD

### Participants & Procedures

Participants were recruited from undergraduate psychology courses at a public Midwestern university. They were given course credit for their participation in the study. All procedures were approved by the university's internal review board, and the participants provided informed consent prior to participation. Participants completed all questionnaires through a secure online system. The current study was a secondary data analysis of data collected to examine relationships between peer victimization and disordered eating symptoms. Measures were completed at two time points approximately eight weeks apart. All measures utilized are attached as an Appendix at the end of the document.

Following the suggestion of Malhotra (2008), participants who took less than 18 minutes, 1.5 standard deviations below the mean completion time, to complete the questionnaires were excluded from analyses to reduce the likelihood that participants who were not attentive while answering the questions had their data included. This excluded 19 participants from our analyses.

The final sample consisted of 302 (63% of original sample completed measures at both time points) male participants with a mean age of 19.2 years ( $SD = 1.3$ ; age range = 18-24). The ethnic composition of the sample was 88.8% White ( $n=269$ ), 1.3% African-American or Black ( $n=4$ ), 5.3% Asian ( $n=16$ ), 2% Hispanic/Latino ( $n=6$ ), and 2.7% Other ( $n=8$ ). An independent sample t-test revealed no significant differences between returners and non-returners (i.e., those who failed to complete the online questionnaires at Time 2) with regards to all predictor and outcome variables at Time 1, all  $p$ -values  $> .05$ . This indicates participants' levels of perfectionism, body dissatisfaction, self-esteem, and binge eating at the time of the initial survey did not appear to affect whether they completed the survey at Time 2.



## Measures

**Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983).** The Eating Disorder Inventory (EDI) is a 64-item self-report measure designed for the assessment of psychological and behavioral traits common in people with eating disorders (See Appendix A). It consists of eight subscales including Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness and Maturity Fears. Items are rated on a scale of 1 (never) to 6 (always). The total score is summed by adding the rating responses for all items on that subscale. Two subscales of the EDI, the Perfectionism subscale and the Body Dissatisfaction subscale, were used in this study. The Perfectionism subscale consists of six items and includes statements such as “Only outstanding performance is good enough in my family” and “I hate being less than best at things.” The Body Dissatisfaction subscale consists of nine items and includes statements such as “I think that my stomach is too big” and “I feel satisfied with the shape of my body (reversed).” Espelage et al. (2003) reported evidence that the EDI is a reliable and valid assessment tool based on data from three samples (archival clinical, treatment study, and nonpatient college). The Perfectionism and Body Dissatisfaction subscales had Cronbach’s alphas of .83 and .85 at Time 1, respectively, which indicates good reliability. Important for the present study, the EDI-2 has been shown to be a valid measure of disordered eating and related variables for college men (Spillane et al., 2004).

**Rosenberg Self-Esteem Scale (Rosenberg, 1965).** The Rosenberg Self-Esteem Scale (RSES) measures global self-esteem (See Appendix B). It consists of ten items and each item is rated on a four-point scale including strongly disagree, disagree, agree, and strongly agree. Five items have a positive orientation and five have a negative orientation. Higher scores indicate higher levels of self-esteem. Sample items include “At times, I think I am no good at all”, and “I

certainly feel useless at times.” The RSES has been found to be a reliable and valid measure for self-esteem (Sinclair et al., 2010). Cronbach’s alpha for the current sample was .89.

**Binge Eating Scale (BES; Gormally, Black, Daston, & Rardin, 1982).** The BES consists of 16 items and each item consists of a group of statements about attitudes and behaviors related to binge eating (See Appendix C). Participants were asked to select the statement from the group that best describes them. Each sentence has a designated score that reflects the severity of the binge eating symptom. For example, one group has the statement “I have no difficulty eating slowly” as the least severe (score of 0) and the statement “Usually I swallow my food almost without chewing, then feel as if I ate too much” (score of 4) as the most severe. Total scores range from 0-46. The BES has been found to be a valid and reliable measure of binge eating (Timmerman, 1993). Cronbach’s alpha for the current sample was .89 at Time 1 and .92 at Time 2.

**Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996).** The BDI-II consists of 21 items that measure depressive symptoms (See Appendix D). For each item, participants select one sentence from a group of four sentences that best reflect their current level of depressive symptomatology. Each sentence has a designated score that reflects the severity of the depressive symptom (scores range from 0-3). For example, one group has the statement “I do not feel I am worthless” as the least severe (score of 0), while the statement that is most severe (score of 3) is “I feel I am utterly worthless.” The BDI-II has been found to be a reliable and valid measure of depression symptoms (Dozois, Dobson, & Ahnberg, 1998). The BDI-II had a Cronbach’s alpha of .93 at Time 1 and .95 at Time 2 in the current sample.

**Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988).** The BAI is a 21-item self-report inventory that was developed to identify the extent to which a person has

recently experienced symptoms of anxiety (See Appendix E). Items contain both cognitive (e.g., nervousness, fear of losing control) and somatic (e.g. heart pounding, difficulty breathing) symptoms of anxiety. Participants were asked to indicate the extent to which each symptom bothered the participant from 0 “not at all” to 3 “severely.” Total scores range from 0 to 63. The BAI has been shown to have adequate reliability and validity (Beck et al., 1988). Cronbach’s alpha for this sample was .91 at Time 1 and .94 at Time 2.

**Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000).** The DMS is a 15-item self-report measure designed to assess dysfunctional attitudes and behaviors related to an individual’s muscularity (See Appendix F). The scales consists of two subscales: the Behaviors scale (DMS-Behaviors) which focuses on muscle development behaviors and the Attitudes scale (DMS-Attitudes) which focuses on attitudes about muscular dissatisfaction. The current study utilized the Attitudes Subscale. Sample items from the DMS include “I wish that I were more muscular,” and “I think I would feel more confident if I had more muscle mass.” Items are rated on a 6-point Likert scale (ranging from 1=always to 6=never). All scores were reversed and totaled. Higher scores indicated greater levels of drive for muscularity. The DMS has been shown to be a valid and reliable measure (McCreary & Sasse, 2000). Cronbach’s alpha in the current sample was .89 at Time 1 and .92 at Time 2.

**Body Mass Index (BMI).** BMI was calculated for each participant from self-reported height and weight.

### CHAPTER 3. RESULTS

Means and standard deviations for predictors and dependent variables, as well as their zero-order correlations are provided in Table 1. Our primary regression analysis focused on testing whether the triple interaction model predicted Time 2 binge eating symptoms while controlling for Time 1 binge eating symptoms. First, Time 1 BES scores and BMI scores were entered to control for initial levels of binge eating and BMI. Next, Time 1 levels of perfectionism, body dissatisfaction, and self-esteem were simultaneously entered to test for main effects of the predictor variables. In the third step, all of the two-way interactions were simultaneously entered (perfectionism x body dissatisfaction, perfectionism x self-esteem, and body dissatisfaction x self-esteem). Finally, the three-way interaction (perfectionism x body dissatisfaction x self-esteem), the critical test of the main hypothesis, was entered. Table 2 displays the results of the regression analysis. The only significant predictors of Time 2 BES scores were Time 1 BES scores,  $\beta = .54$ ,  $t(301) = 69.82$ ,  $p < .001$ , and the three-way interaction,  $\beta = -.15$ ,  $t(294) = -2.67$ ,  $p < .01$ ; no simple effects or two-way interactions significantly predicted Time 2 BES scores.

To appraise the nature of this interaction, simple slopes were calculated utilizing methods specified in Preacher, Curran, & Bauer (2006), and then graphed (see Figure 1). As can be seen in Figure 1, there is no clinically meaningful difference in BES scores at Time 2 across the graphed interactions (the magnitude of the greatest difference between points is less than .2). Although it is statistically significant, it is not clinically meaningful. The hypothesis that the triple interaction would predict Time 2 binge eating symptoms in a clinically meaningful way while controlling for Time 1 binge eating symptoms was not supported by the data.

Binge eating symptoms at Time 1 and Time 2 were highly correlated,  $r(320) = .53, p < .01$ . Thus, we repeated the regression analysis removing the Time 1 covariate to determine whether the model is predictive when the variance accounted for by Time 1 BES scores was removed,  $\beta = -.20, t(295) = -3.18, p < .01$  (See Table 3, Figure 2). Although this data analytic strategy is different from that previously proposed, it nonetheless evaluates the ability of the three risk factors (perfectionism, body dissatisfaction, and self-esteem) to predict BES scores at Time 2. The results of this analysis were consistent with our hypothesis, in that high perfectionism, high body dissatisfaction, and low self-esteem predicted Time 2 BES scores. Therefore, the triple interaction model is predictive of binge eating symptoms over a two-month period.

To ensure that prediction of Time 2 BES scores was not simply accounted for by participant BMI, we entered BMI as a covariate in the first step. This yielded results similar in direction, magnitude, and significance to those obtained without controlling for BMI demonstrating that a participant's BMI at Time 1 does not impact their BES scores at Time 2,  $\beta = -.19, t(294) = -3.13, p < .01$ .

Since men typically tend to strive to be more muscular than women, muscle dissatisfaction may be another relevant measurement of body image for men in body dissatisfaction focused on thinness (Adams, Turner, & Bucks, 2005). To test whether muscle dissatisfaction in the presence of high perfectionism and low self-esteem predicts Time 2 BES scores, we entered Time 1 DMS Attitude scores as a predictor variable in place of EDI-Body Dissatisfaction scores. Analyses revealed that, when Time 1 DMS scores are used in place of Time 1 EDI-BD scores, the model is no longer predictive of Time 2 BES scores,  $\beta = -.003, t(294) = -.06, p > .05$  (See Table 5).

To assess the symptom specificity aspect the model, we conducted hierarchical multiple regression procedures to determine whether the model also predicts Time 2 BDI and BAI scores when the variance accounted for by Time 1 BDI scores and Time 1 BAI scores was removed. The three-way interaction did not predict Time 2 BAI scores from Time 1 to Time 2,  $\beta = -.05$ ,  $t(295) = -.83$ ,  $p > .05$  (See Table 4). Similarly, the interaction did not predict Time 2 BDI scores from Time 1 to Time 2,  $\beta = -.07$ ,  $t(295) = -1.09$ ,  $p > .05$  (see Table 6). These findings indicate that the triple interaction of perfectionism, self-esteem, and body dissatisfaction does not predict anxiety or depression symptoms and suggest the model is specific to binge eating symptoms.

Finally, to determine whether the triple interaction model is able to predict Time 2 BES scores above and beyond the influence of anxiety and depressive symptoms, we entered Time 1 BDI and Time 1 BAI scores as covariates in the first step of the analysis. Analyses revealed that the model significantly predicted Time 2 BES scores after controlling for Time 1 BAI score and Time 1 BDI scores,  $\beta = -.22$ ,  $t(294) = -3.71$ ,  $p < .001$ . These findings further support the notion that the model predicts a change in BES scores independently of anxiety or depressive symptoms.

## CHAPTER 4. DISCUSSION

The current study tested a triple interaction model that proposes that the confluence of high perfectionism, high body dissatisfaction, and low self-esteem puts people at risk for binge eating (Vohs et al., 2001; Bardone-Cone et al., 2006). This study was the first to test the triple interaction model in a sample of men. Contrary to our hypothesis, the triple interaction model was not predictive a clinically meaningful way when controlling for Time 1 binge eating symptoms, which indicate that the model did not predict binge eating symptoms above and beyond baseline symptoms. It is possible that two months is not enough time to capture the development of binge eating symptoms and the results of our initial regression analysis may have more closely resembled our hypothesis had there been a longer duration between Time 1 and Time 2 measurements. However, when initial levels of binge eating symptoms were not included in the model, the results were consistent with our hypothesis in that high perfectionism, high body dissatisfaction, and low self-esteem predict binge eating symptoms at Time 2 while controlling for Time 1 BMI scores. Specifically, higher levels of perfectionism, lower levels of self-esteem, and negative bodily feelings at baseline were predictive of greater binge eating symptom levels two months later.

Muscle dissatisfaction has been used as a measurement of body dissatisfaction in men due to the societal importance placed on muscularity for males in the United States (Cafri & Thompson, 2004; Weineke, 1998). We tested the triple interaction model with an index of body dissatisfaction that focuses on attitudes about one's muscularity rather than thinness as well. The interaction between muscle dissatisfaction, perfectionism, and self-esteem was not statistically significant. This indicates body dissatisfaction is unique from muscle dissatisfaction and is not predictive of binge eating in the presence of high perfectionism and low self-esteem.

Furthermore, this suggests thinness is also relevant for men with binge eating, which is consistent with previous research indicating men and women with eating disorders exhibit similar presentations.

In addition to predicting the development of binge eating symptoms, the current study examined the model's symptom specificity with respect to the development of anxiety and depressive symptoms. We found that the interactive model does not predict anxiety and depressive symptoms at Time 2. Similarly, the triple interaction significantly predicts Time 2 binge eating even after controlling for baseline anxiety and depressive symptoms. Thus, the model is predictive above and beyond the influence of anxiety and depressive symptoms.

Theoretically, this study extends the findings of previous research regarding the predictive nature of the triple interaction model in developing binge eating symptoms. Previous studies examined the model only as it pertains to women. The current study considered the model as it applies to men, which is an understudied population in eating disorder research despite the comparable rates of binge eating in men and women.

There may also be clinical implications from our findings. Our results suggest that when clinicians are working with male clients who exhibit perfectionism, body dissatisfaction, and low self-esteem, these clients should be assessed for the presence of binge eating because of their elevated risk. Furthermore, three-way interaction models provide flexibility for clinicians in their preventive and treatment efforts, in that focusing on any one variable in the model (as opposed to all three) could potentially reduce binge eating (Bardone et al., 2000). In particular, focusing on perfectionistic attitudes, body image concerns, or self-esteem could alleviate binge eating symptoms. Enhanced cognitive behavioral therapy, a therapy that has substantial empirical support as an efficacious treatment for binge eating, addresses the risk factors identified in the



triple interaction model (Fairburn, Cooper, Shafran, 2003; Grilo, Masheb, Wilson, Gueorguieva, & White, 2011; Grilo, Masheb, & Crosby, 2012; Hilbert et al., 2012). The treatment identifies core low self-esteem, clinical perfectionism, and overvaluation of weight and shape as factors that maintain eating disordered behaviors and utilizes cognitive and behavioral interventions to eliminate these “maintaining” factors (Murphy, Straebl, Cooper, & Fairburn, 2010). According to the therapy’s theory, removing these maintaining factors should result in the elimination of eating disordered behaviors. Similarly, body dissatisfaction is targeted in Thomas Cash’s Body Image Workbook, an eight-step self-help program aimed at improving body image, which has been empirically shown to increase body image satisfaction (Cash, 2008).

There are limitations that must be considered when evaluating our results. First, the data obtained was based solely on self-report measures, which have the potential for self-presentational biases (Fairburn & Beglin, 1994). Second, there is a possibility of a selection bias between those who returned and those who did not. These concerns are reduced in light of findings that there are no significant differences between the two groups on key variables. Third, participants in this study were recruited from a nonclinical population. However, the increasing prevalence of eating disordered behaviors among college students makes this population a reasonable alternative to clinical populations. Nonetheless, future research is necessary to determine whether this model generalizes to clinical populations. Fourth, the sample was primarily White. Given the relatively high prevalence of binge eating among other racial groups, it is necessary to test the model utilizing a more diverse sample (Alegria et al., 2007; Marques et al., 2011). Furthermore, future research should investigate the predictive nature of the interplay of these variables over a longer period of time, as two months may not be an adequate time period for studying the development of binge eating symptoms. Finally, though the sample size

was relatively large, binge eating is a relatively rare behavior. Therefore, there may have been suboptimal statistical power for testing our hypothesis in this sample despite the fact that it was comparable to previous studies conducted in samples of college women.

To our knowledge this was the first study to investigate the interaction of three theoretically related risk factors for binge eating in men and to propose a model that provides an explanation of the mechanisms by which the risk factors interact to make men vulnerable to developing binge eating behaviors. The study's strengths include proposing hypotheses with a strong theoretical basis, using a large sample size, explicitly measuring of behaviors using well-regarded instruments, and examining an understudied population in eating disorder literature.

Table 1

*Descriptive Data and Zero-Order Correlations for Predictor and Dependent Measures*

Measure	1	2	3	4	5	6	7	8	9	10	11
1. EDI-P	-										
2. EDI-BD	.07	-									
3. RSE	.13**	.39**	-								
4. BES	.17**	.52**	.39**	-							
(T1)											
5. BES	.13*	.31**	.25**	.53**	-						
(T2)											
6. BDI	.22**	.31**	.64**	.54**	.30**	-					
(T1)											
7. BDI	.13*	.15**	.39**	.50**	.55**	.58**	-				
(T2)											
8. BAI	.19**	.21**	.46**	.33**	.29**	.58**	.48**	-			
(T1)											
9. BAI	.09	.09	.28**	.27**	.48**	.37**	.64**	.56**	-		
(T2)											
10. BMI	.00	.46**	-.06	.27**	.17**	.04	-.05	-.02	-.01	-	
(T1)											
11. BMI	-.04	.53**	-.10	.32**	.16**	.06	-.03	-.09	-.07	.88**	-
(T2)											
12. DMS-	.35**	.19**	-	.19**	.15**	.25**	.17**	.20**	.08	-.08	-.13*
A			.28**								
Means	20.58	21.18	32.16	21.49	21.09	5.99	5.10	8.12	7.14	24.82	25.12
Standard	6.16	8.96	5.66	5.83	6.28	7.60	7.48	7.96	8.36	4.24	4.48
Deviations											
Observed	6-36	9-54	14-	16-	16-	0-41	0-37	0-40	0-	15.41-	12.55-
Range			40	47	47				48	43.85	44.09

*Note.* Perfectionism, body dissatisfaction, and self-esteem refer to T1 assessments. EDI-P= Eating Disorder-Perfectionism Subscale; EDI-BD= Eating Disorder-Body Dissatisfaction Subscale; RSE= Rosenberg Self-Esteem Scale; BES= Binge Eating Scale; BDI= Beck Depression Inventory; Beck Anxiety Inventory; BMI= Body Mass Index; DMS-A= Drive for Muscularity Attitudes Subscale.

\*  $p < .05$ ; \*\*  $p < .01$

Table 2

*Three-Way Interaction of Perfectionism, Body Dissatisfaction, and Self-Esteem and Their Prediction of T2 Binge Eating Scale Scores*

Set Entry Order	Predictors in Set	<i>F</i> for Set	<i>t</i> for Within-Set Predictors	<i>df</i> for Each Test	Partial Correlation	Model $R^2$ ( $\Delta R^2$ )
1.	Time 1 Binge Eating Scale BMI	60.22	7.92** -.29	2, 300	.42 -.02	.29
2.	Main Effects EDI-P EDI-BD RSE	24.34	.25 .16 -.07	5, 297 297 297	.02 .01 -.01	.29
3.	Two-way interactions EDI-P X EDI-BD EDI-P X RSE EDI-BD X RSE	15.43	.45 -.48 .25	8, 294 294 294	.03 -.03 .02	.30 (.01)
4.	Three-way interaction EDI-P X EDI-BD X RSE	14.80	-2.67**	9, 293 293	-.15	.31 (.01)

*Note.* Perfectionism, body dissatisfaction, and self-esteem refer to T1 assessments. EDI-P= Eating Disorder-Perfectionism Subscale; EDI-BD= Eating Disorder-Body Dissatisfaction Subscale; RSE= Rosenberg Self-Esteem Scale; BES= Binge Eating Scale.  $\Delta R^2$ = change in  $R^2$  with the addition of each step in the regression.

\*  $p < .05$ ; \*\*  $p < .01$

Table 3

*Three-Way Interaction of Perfectionism, Body Dissatisfaction, and Self-Esteem and Their Prediction of T2 BES Scores (without controlling for T1 BES Scores)*

Set Entry Order	Predictors in Set	F for Set	t for Within-Set Predictors	df for Each Test	Partial Correlation	Model $R^2$ ( $\Delta R^2$ )
1.	BMI	8.27	.70	1, 301	.04	.03
2.	Main Effects	9.73		4, 298		.12 (.09)
	EDI-P		.70	298	.04	
	EDI-BD		2.33*	298	.14	
	RSE		-1.96	298	-.11	
3.	Two-way interactions	6.72		7, 295		.14 (.02)
	EDI-P X EDI-BD		.68	295	.04	
	EDI-P X RSE		-.38	295	-.02	
	EDI-BD X RSE		-1.16	295	-.07	
4.	Three-way interaction	7.28		8, 294		.17 (.03)
	EDI-P X EDI-BD X RSE		-3.13**	294	-.18	

*Note.* Perfectionism, body dissatisfaction, and self-esteem refer to T1 assessments. EDI-P= Eating Disorder-Perfectionism Subscale; EDI-BD= Eating Disorder-Body Dissatisfaction Subscale; RSE= Rosenberg Self-Esteem Scale; BES= Binge Eating Scale.  $\Delta R^2$ = change in  $R^2$  with the addition of each step in the regression.

\*  $p < .05$ ; \*\*  $p < .01$

Table 4

*Three-Way Interaction of Perfectionism, Body Dissatisfaction, and Self-Esteem and Their Prediction of T2 BAI Scores*

Set Entry Order	Predictors in Set	<i>F</i> for Set	<i>t</i> for Within-Set Predictors	<i>df</i> for Each Test	Partial Correlation	Model $R^2$ ( $\Delta R^2$ )
1.	Main Effects	8.40		3, 299		.08
	EDI-P		.43	299	.03	
	EDI-BD		-.66	299	-.04	
	RSE		-4.40**	299	-.25	
2.	Two-way interactions	4.67		6, 296		.09 (.01)
	EDI-P X EDI-BD		.57	296	.03	
	EDI-P X RSE		.19	296	.01	
	EDI-BD X RSE		-1.11	296	-.07	
3.	Three-way interaction	4.10		7, 295		.09
	EDI-P X EDI-BD X RSE		-.83	295	-.05	

*Note.* Perfectionism, body dissatisfaction, and self-esteem refer to T1 assessments. EDI-P= Eating Disorder-Perfectionism Subscale; EDI-BD= Eating Disorder-Body Dissatisfaction Subscale; RSE= Rosenberg Self-Esteem Scale; BAI= Beck Anxiety Inventory.  $\Delta R^2$ = change in  $R^2$  with the addition of each step in the regression.

\*  $p < .05$ ; \*\*  $p < .01$

Table 5

*Three-Way Interaction of Perfectionism, Muscle Dissatisfaction, and Self-Esteem and Their Prediction of T2 Binge Eating Scale Scores*

Set Entry Order	Predictors in Set	<i>F</i> for Set	<i>t</i> for Within-Set Predictors	<i>df</i> for Each Test	Partial Correlation	Model $R^2$ ( $\Delta R^2$ )
1.	Time 1 Binge Eating Scale	120.84	9.69**	1, 301	.54	.29
2.	Main Effects	30.44		4, 298		.29 (.09)
	EDI-P		1.11	298	.06	
	DMS-A		-.16	298	-.09	
	RSE		.03	298	0	
3.	Two-way interactions	18.51		7, 295		.31 (.02)
	EDI-P X DMS-A		-2.13*	295	-.12	
	EDI-P X RSE		-1.43	295	-.08	
	DMS-A X RSE		-.45	295	-.03	
4.	Three-way interaction	16.13		8, 294		.31
	EDI-P X DMS-A X RSE		-.06	294	0	

*Note.* Perfectionism, muscle dissatisfaction, and self-esteem refer to T1 assessments. EDI-P= Eating Disorder-Perfectionism Subscale; DMS-A= Drive for Muscularity Attitude Subscale; RSE= Rosenberg Self-Esteem Scale; BES= Binge Eating Scale.  $\Delta R^2$ = change in  $R^2$  with the addition of each step in the regression.

\*  $p < .05$ ; \*\*  $p < .01$

Table 6  
*Three-Way Interaction of Perfectionism, Body Dissatisfaction, and Self-Esteem and Their Prediction of T2 BDI Scores*

Set Entry Order	Predictors in Set	F for Set	t for Within-Set Predictors	df for Each Test	Partial Correlation	Model $R^2$ ( $\Delta R^2$ )
1.	Main Effects	18.47		3, 299		.16
	EDI-P		.47	299	.03	
	EDI-BD		-1.21	299	-.07	
	RSE		-6.53**	299	-.36	
2.	Two-way interactions	11.94		6, 296		.20 (.04)
	EDI-P X EDI-BD		.49	296	.03	
	EDI-P X RSE		-.91	296	-.05	
	EDI-BD X RSE		-2.79	296	-.16	
3.	Three-way interaction	10.41		7, 295		.20
	EDI-P X EDI-BD X RSE		-1.09	295	-.06	

*Note.* Perfectionism, body dissatisfaction, and self-esteem refer to T1 assessments. EDI-P= Eating Disorder-Perfectionism Subscale; EDI-BD= Eating Disorder-Body Dissatisfaction Subscale; RSE= Rosenberg Self-Esteem Scale; BDI= Beck Depression Inventory.  $\Delta R^2$ = change in  $R^2$  with the addition of each step in the regression.

\*  $p < .05$ ; \*\*  $p < .01$



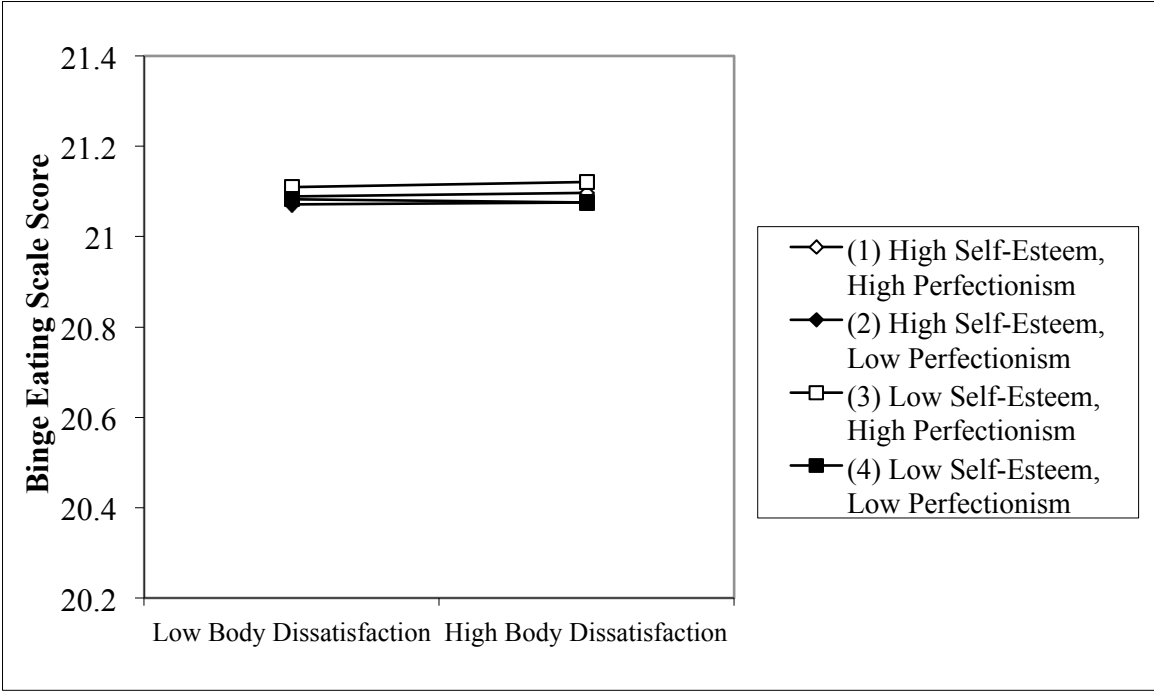


Figure 1. Simple slopes of regression analysis that controlled for Time 1 binge eating.

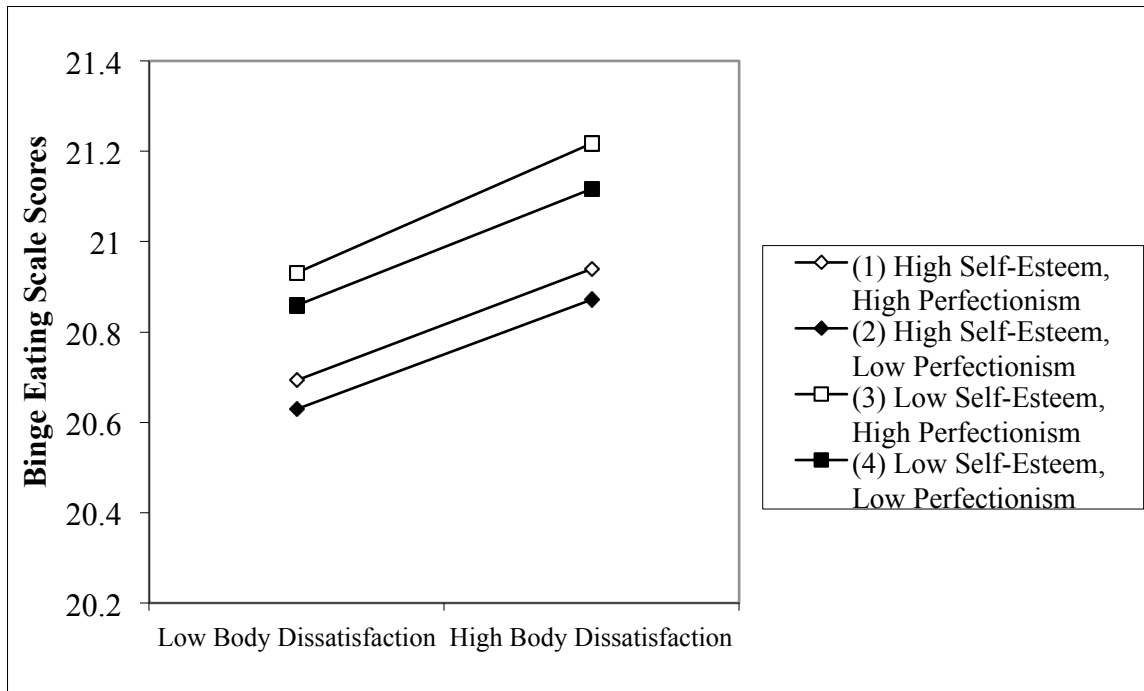


Figure 2. Simple slopes of regression analysis that did not control for Time 1 binge eating.

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## APPENDIX A. EATING DISORDER INVENTORY

DIRECTIONS: Please read each item carefully then, for each one, write the number that best applies to you.

1	2	3	4	5	6
Never	Rarely	Sometimes	Frequently	Usually	Always

- \_\_\_\_\_ I eat sweets and carbohydrates without feeling nervous.
- \_\_\_\_\_ I think that my stomach is too big.
- \_\_\_\_\_ I wish that I could return to the security of childhood.
- \_\_\_\_\_ I eat when I am upset.
- \_\_\_\_\_ I stuff myself with food.
- \_\_\_\_\_ I wish that I could be younger.
- \_\_\_\_\_ I think about dieting.
- \_\_\_\_\_ I get frightened when my feelings are too strong.
- \_\_\_\_\_ I think that my thighs are too large.
- \_\_\_\_\_ I feel ineffective as a person.
- \_\_\_\_\_ I feel extremely guilty after overeating.
- \_\_\_\_\_ I think that my stomach is just the right size.
- \_\_\_\_\_ Only outstanding performance is good enough in my family.
- \_\_\_\_\_ The happiest time in life is when you are a child.
- \_\_\_\_\_ I am open about my feelings.
- \_\_\_\_\_ I am terrified of gaining weight.
- \_\_\_\_\_ I trust others.
- \_\_\_\_\_ I feel alone in the world.
- \_\_\_\_\_ I feel satisfied with the shape of my body.
- \_\_\_\_\_ I feel generally in control of things in my life.
- \_\_\_\_\_ I get confused about what emotion I am feeling.
- \_\_\_\_\_ I would rather be an adult than a child.
- \_\_\_\_\_ I can communicate with others easily.
- \_\_\_\_\_ I wish I were someone else.
- \_\_\_\_\_ I exaggerate or magnify the importance of weight.
- \_\_\_\_\_ I can clearly identify what emotion I am feeling.
- \_\_\_\_\_ I feel inadequate.
- \_\_\_\_\_ I have gone on eating binges where I have felt that I could not stop.
- \_\_\_\_\_ As a child, I tried very hard to avoid disappointing my parents and teachers.
- \_\_\_\_\_ I have close relationships.
- \_\_\_\_\_ I like the shape of my buttocks.
- \_\_\_\_\_ I am preoccupied with the desire to be thinner.
- \_\_\_\_\_ I don't know what's going on inside me.

- \_\_\_\_\_ I have trouble expressing my emotions to others.
- \_\_\_\_\_ The demands of adulthood are too great.
- \_\_\_\_\_ I hate being less than best at things.
- \_\_\_\_\_ I feel secure about myself.
- \_\_\_\_\_ I think about bingeing (overeating).
- \_\_\_\_\_ I feel happy that I am not a child anymore.
- \_\_\_\_\_ I get confused as to whether or not I am hungry.
- \_\_\_\_\_ I have a low opinion of myself.
- \_\_\_\_\_ I feel that I can achieve my standards.
- \_\_\_\_\_ My parents have expected excellence of me.
- \_\_\_\_\_ I worry that my feelings will get out of control.
- \_\_\_\_\_ I think that my hips are too big.
- \_\_\_\_\_ I eat moderately in front of others and stuff myself when they're gone.
- \_\_\_\_\_ I feel bloated after eating a normal meal.
- \_\_\_\_\_ I feel that people are happiest when they are children.
- \_\_\_\_\_ If I gain a pound, I worry that I will keep gaining.
- \_\_\_\_\_ I feel that I am a worthwhile person.
- \_\_\_\_\_ When I am upset, I don't know if I am sad, frightened, or angry.
- \_\_\_\_\_ I feel that I must do things perfectly, or not do them at all.
- \_\_\_\_\_ I have the thought of trying to vomit to lose weight.
- \_\_\_\_\_ I need to keep people at a certain distance (feel uncomfortable if someone tries to get to close).
- \_\_\_\_\_ I think that my thighs are just the right size.
- \_\_\_\_\_ I feel empty inside (emotionally).
- \_\_\_\_\_ I can talk about personal thoughts or feelings.
- \_\_\_\_\_ The best years of your life are when you become an adult.
- \_\_\_\_\_ I think that my buttocks are too large.
- \_\_\_\_\_ I have feelings I can't quite identify.
- \_\_\_\_\_ I eat or drink in secrecy.
- \_\_\_\_\_ I think that my hips are just the right size.
- \_\_\_\_\_ I have extremely high goals.
- \_\_\_\_\_ When I am upset, I worry that I will start eating.

## APPENDIX B. ROSENBERG SELF-ESTEEM SCALE

Please record the appropriate answer per item, depending on whether you agree, strongly agree, disagree, or strongly disagree with it.

- 1 = Strongly Agree
- 2 = Agree
- 3 = Disagree
- 4 = Strongly Disagree

- \_\_\_\_\_ 1. On the whole, I am satisfied with myself.
- \_\_\_\_\_ 2. At times, I think I am no good at all.
- \_\_\_\_\_ 3. I feel that I have a number of good qualities.
- \_\_\_\_\_ 4. I am able to do things as well as most other people.
- \_\_\_\_\_ 5. I feel I do not have much to be proud of.
- \_\_\_\_\_ 6. I certainly feel useless at times.
- \_\_\_\_\_ 7. I feel that I'm a person of worth, at least on an equal plan with others.
- \_\_\_\_\_ 8. I wish I could have more respect for myself.
- \_\_\_\_\_ 9. All in all, I am inclined to feel that I am a failure.
- \_\_\_\_\_ 10. I take a positive attitude toward myself.

## APPENDIX C. GORMALLY BINGE EATING SCALE

Below are groups of numbered statements. Read all of the statements in each group and mark on this sheet the one that best describes the way you feel about the problems you have controlling your eating behavior.

- 1)
  - 0 I don't feel self-conscious about my weight or body size when I'm with others.
  - 1 I feel concerned about how I look to others, but it normally does not make me feel disappointed in myself.
  - 2 I do get self-conscious about my appearance and weight which makes me feel disappointed in myself.
  - 3 I feel very self-conscious about my weight and frequently, I feel intense shame and disgust for myself.
  - 4 I try to avoid social contacts because of my self-consciousness.
  
- 2)
  - 0 I don't have any difficulty eating slowly in the proper manner.
  - 1 Although I seem to "gobble down" foods, I don't end up feeling stuffed because of eating too much.
  - 2 At times, I tend to eat quickly and then I feel uncomfortably full afterwards.
  - 3 I have the habit of bolting down my food, without really chewing it. When this happens, I usually feel uncomfortably stuffed because I've eaten too much.
  
- 3)
  - 0 I feel capable to control my eating urges when I want to.
  - 1 I feel like I have failed to control my eating more than the average person.
  - 2 I feel utterly helpless when it comes to feeling in control of my eating urges.
  - 3 Because I feel so helpless about controlling my eating I have become very desperate about trying to get in control.
  
- 4)
  - 0 I don't have the habit of eating when I'm bored.
  - 1 I sometimes eat when I'm bored, but often I'm able to "get busy" and get my mind off food.
  - 2 I have a regular habit of eating when I'm bored, but occasionally I can use some other activity to get my mind off eating.
  - 3 I have a strong habit of eating when I'm bored. Nothing seems to help me break the habit.
  
- 5)
  - 0 I'm usually physically hungry when I eat something.
  - 1 Occasionally, I eat something on impulse even though I really am not hungry.
  - 2 I have the regular habit of eating foods that I might not really enjoy to satisfy a hungry feeling even though physically, I don't need the food.
  - 3 Even though I'm not physically hungry, I get a hungry feeling in my mouth that only seems to be satisfied when I eat a food, like a sandwich, that fills my mouth.
  - 4 Sometimes, when I eat the food to satisfy my mouth hunger, I then spit the food out so that I won't gain weight.



- 6) 0 I don't feel any guilt or self-hate, after I overeat.  
 1 After I overeat, occasionally I feel guilt or self-hate.  
 2 Almost all the time I experience strong guilt or self-hate after I overeat.
- 7) 0 I don't lose total control of my eating when dieting even after periods when I overeat.  
 1 Sometimes when I eat a "forbidden food" on a diet, I feel like I "blew it" and eat even more.  
 2 Frequently I have the habit of saying to myself, "I've blown it now, why not go all the way", when I overeat on a diet.  
 3 I have a regular habit of starting strict diets for myself, but I break the diets by going on an eating binge.  
 4 My life seems to be either a "feast" or "famine".
- 8) 0 I rarely eat so much food that I feel uncomfortably stuffed afterwards.  
 1 Usually about once a month, I eat such a quantity of food, I end up feeling very stuffed.  
 2 I have regular periods during the month when I eat large amounts of food, either at mealtime or at snacks.  
 3 I eat so much food that I regularly feel quite uncomfortable after eating and sometimes a bit nauseous.
- 9) 0 My level of calorie intake does not go up very high or go down very low on a regular basis.  
 1 Sometimes after I overeat, I will try to reduce my caloric intake to almost nothing to compensate for the excess calories I've eaten.  
 2 I have a regular habit of overeating during the night. It seems that my routine is not to be hungry in the morning but overeat in the evening.  
 3 In my adult years, I have had week long periods when I overeat. It seems I live a life of either "feast or famine".
- 10) 0 I usually am able to stop eating when I want to. I know when "enough is enough".  
 1 Every so often, I experience a compulsion to eat which I can't seem to control.  
 2 Frequently, I experience strong urges to eat which I seem unable to control, but at other times I can control my eating urges.  
 3 I feel incapable of controlling urges to eat. I have a fear of not being able to stop eating voluntarily.
- 11) 0 I don't have any problem stopping eating when I feel full.  
 1 I usually can stop eating when I feel full but occasionally overeat leaving me feeling uncomfortably stuffed.  
 2 I have a problem stopping eating once I start and usually I feel uncomfortably stuffed after I eat a meal.

- 3 Because I have a problem not being able to stop eating when I want, I sometimes have to induce vomiting to relieve my stuffed feeling.
- 12) 0 I seem to eat just as much when I'm with others (family, social gatherings) as when I'm by myself.  
 1 Sometimes, when I'm with other people, I don't eat as much as I want to eat because I'm self-conscious about my eating.  
 2 Frequently, I eat only a small amount of food when others are present, because I'm very embarrassed about my eating.  
 3 I feel so ashamed about overeating that I pick times to overeat when I know no one will see me. I feel like a "closet eater".
- 13) 0 I eat three meals a day with only an occasional between meal snack.  
 1 I eat three meals a day, but I also normally snack between meals.  
 2 When I am snacking heavily, I get in the habit of skipping regular meals.  
 3 There are regular periods when I seem to be continually eating, with no planned meals.
- 14) 0 I don't think much about trying to control unwanted eating urges.  
 1 At least some of the time, I feel my thoughts are pre-occupied with trying to control my eating urges.  
 2 I feel that frequently I spend much time thinking about how much I ate or about trying not to eat anymore.  
 3 It seems to me that most of my waking hours are pre-occupied with thoughts about food. I feel like I live to eat.
- 15) 0 I don't think about food a great deal.  
 1 I have strong cravings for food but they last only for brief periods of time.  
 2 I have days when I can't seem to think about anything else but food.  
 3 Most of my days seem to be pre-occupied with thoughts about food. I feel like I live to eat.
- 16) 0 I usually know whether or not I'm physically hungry. I take the right portion of food to satisfy me.  
 1 Occasionally, I feel uncertain about knowing whether or not I'm physically hungry. At times it's hard to know how much food I should take to satisfy me.  
 2 Even though I might know how many calories I should eat, I don't have any idea what is a "normal" amount of food for me.

## APPENDIX D. BECK DEPRESSION INVENTORY

Instructions: On this questionnaire are groups of statements. Please read all the statements in a given group. Then pick out the one statement in each group that you believe describes how the person in the story felt during the past 2 weeks. Circle the number beside the statement you have chosen. Be sure to read all the statements in each group before making your choice.

- 1)     0     I do not feel sad.  
       1     I feel sad much of the time.  
       2     I am sad all the time.  
       3     I am so sad or unhappy that I can't stand it.
  
- 2)     0     I am not discouraged about my future.  
       1     I feel more discouraged about my future than I used to be.  
       2     I do not expect things to work out for me.  
       3     I feel that my future is hopeless and will only get worse.
  
- 3)     0     I do not feel like a failure.  
       1     I have failed more than I should have.  
       2     As I look back, I see a lot of failures.  
       3     I feel I am a total failure as a person.
  
- 4)     0     I get as much pleasure as I ever did from the things I enjoy.  
       1     I don't enjoy things as much as I used to.  
       2     I get very little pleasure from the things I used to enjoy.  
       3     I can't get any pleasure from the things I used to enjoy.
  
- 5)     0     I don't feel particularly guilty.  
       1     I feel guilty over many things I have done or should have done.  
       2     I feel quite guilty most of the time.  
       3     I feel guilty all of the time.
  
- 6)     0     I don't feel I am being punished.  
       1     I feel I may be punished.  
       2     I expect to be punished.  
       3     I feel I am being punished.
  
- 7)     0     I feel the same about myself as ever.  
       1     I have lost confidence in myself.  
       2     I am disappointed in myself.  
       3     I dislike myself.
  
- 8)     0     I don't blame or criticize myself more than usual.  
       1     I am more critical of myself than I used to be.  
       2     I criticize myself for all my faults.  
       3     I blame myself for everything bad that happens.

- 9) 0 I don't have any thoughts of killing myself.  
 1 I have thoughts of killing myself but I would not carry them out.  
 2 I would like to kill myself.  
 3 I would kill myself if I had the chance.
- 10) 0 I don't cry anymore than I used to.  
 1 I cry more than I used to.  
 2 I cry over every little thing.  
 3 I feel like crying, but I can't.
- 11) 0 I am no more restless or wound up than usual.  
 1 I feel more restless or wound up than usual.  
 2 I am so restless or agitated that it's hard to stay still.  
 3 I am so restless or agitated that I have to keep moving or doing something.
- 12) 0 I have not lost interest in other people or activities.  
 1 I am less interested in other people or things than before.  
 2 I have lost most of my interest in other people or things.  
 3 It's hard to get interested in anything.
- 13) 0 I make decisions about as well as ever.  
 1 I find it more difficult to make decisions than usual.  
 2 I have much greater difficulty in making decisions than I used to.  
 3 I have trouble making any decisions.
- 14) 0 I do not feel I am worthless.  
 1 I don't consider myself as worthwhile and useful as I used to.  
 2 I feel more worthless as compared to other people.  
 3 I feel utterly worthless.
- 15) 0 I have as much energy as ever.  
 1 I have less energy than I used to have.  
 2 I don't have enough energy to do very much.  
 3 I don't have enough energy to do anything.
- 16) 0 I have not experienced any change in my sleeping pattern.  
 1a I sleep somewhat more than usual.  
 1b I sleep somewhat less than usual.  
 2a I sleep a lot more than usual.  
 2a I sleep a lot less than usual.  
 3a I sleep most of the day.  
 3b I wake up 1-2 hours early and can't get back to sleep.
- 17) 0 I am no more irritable than usual  
 1 I am more irritable than usual.  
 2 I am much more irritable than usual.

- 3 I am irritable all the time.
- 18) 0 I have not experienced any change in my appetite.  
1a My appetite is somewhat less than usual.  
1b My appetite is somewhat greater than usual.  
2a My appetite is much less than before.  
2b My appetite is much greater than usual.  
3a I have no appetite at all.  
3b I crave food all the time.
- 19) 0 I can concentrate now as well as ever.  
1 I can't concentrate as well as usual.  
2 It's hard to keep my mind on anything for very long.  
3 I find I can't concentrate on anything.
- 20) 0 I am no more tired or fatigued than usual.  
1 I get more tired or fatigued more easily than usual.  
2 I am too tired or fatigued to do a lot of the things I used to do.  
3 I am too tired or fatigued to do most of the things I used to do.
- 21) 0 I have not noticed any recent change in my interest in sex.  
1 I am less interested in sex than I used to be.  
2 I am much less interested in sex now.  
3 I have lost interest in sex completely.

## APPENDIX E. BECK ANXIETY INVENTORY

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3

## APPENDIX F. DRIVE FOR MUSCULARITY SCALE

Please read each item carefully, then, for each one, circle the number that best applies to you.

	1	2	3	4	5	6
	Always	Very Often	Often	Sometimes	Rarely	Never
1. I wish that I were more muscular.	1	2	3	4	5	6
2. I lift weights to build up muscle.	1	2	3	4	5	6
3. I use protein or energy supplements.	1	2	3	4	5	6
4. I drink weight gain or protein shakes.	1	2	3	4	5	6
5. I try to consume as many calories as I can in a day.	1	2	3	4	5	6
6. I feel guilty if I miss a weight training session.	1	2	3	4	5	6
7. I think I would feel more confident if I had more muscle mass.	1	2	3	4	5	6
8. Other people think I work out with weights too often.	1	2	3	4	5	6
9. I think that I would look better if I gained 10 pounds in bulk.	1	2	3	4	5	6
10. I think about taking anabolic steroids.	1	2	3	4	5	6
11. I think that I would feel stronger if I had gained a little more muscle mass.	1	2	3	4	5	6
12. I think that my weight training schedule interferes with other aspects of my life.	1	2	3	4	5	6

- |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 13. I think that my arms are not muscular enough. | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. I think that my chest is not muscular enough. | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. I think that my legs are not muscular enough. | 1 | 2 | 3 | 4 | 5 | 6 |